Science System Status

Presentation to the MODIS Science Team
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Mike Moore/ESDIS
mike.moore@gsfc.nasa.gov

At-Launch (Release 4) ECS Capabilities

- External interfaces for EDOS ingest; Landsat-7 LPS and IAS ingest; ASTER DAR, ingest, and expedited data; Attitude data from FDD; Detailed activity schedule data from EOC; Ingest, archive and retrieval of Sage III products from MOC; Ancillary data from NOAA (CEMSCS); Ingest of SCF-provided data
- B.0 data model
- Archive and retrieval of AM-1 and Landsat-7 0R and CPF data
- Granule versioning
- Archive backup and restore
- AM-1 science software integration and test tools
- Planning and scheduling tools
- Ad hoc reprocessing
- Plan reactivation and replanning
- Production rules for all AM-1 products
- Large order management through threshold checks and order partitioning
- Optimized data distribution cache management
- Combined product distribution
- Media (8mm) and electronic (FTP pull and push) data distribution
- Landsat-7 scene based subsetting and CPF distribution in Landsat-7 distribution format
- Operator-assisted science QA from SCF
- User account management
- Advertisement of data products and services
- Java-based DAR Tool
- Data search and order via V0 interface
- Integrated browse
- Landsat billing and accounting workaround
- Operator-assisted subscriptions/standing orders
- Data visualization using EOSView
- Operator GUIs
- Systems management tools and services, including multi-mode management
- Core infrastructure services
- Server failure recovery

Ingest and Archive Status

- Verified capabilities
  - Landsat-7 L0R data ingest and archive
  - AM-1 L0 and ancillary data ingest and archive
  - FDD attitude data ingest and archive
  - NOAA ancillary data ingest and archive
  - Ingest and archive of Sage-III L0 data from MOC
- Issues
  - NOAA data types have changed since ECS implemented this interface; current interface has been verified; CCR is being worked.
  - D3 Ingest for ASTER cannot perform full daily throughput due to server failures.
  - Detailed Activity Schedules from EMOS will not be available until May patch.
  - Observation Schedule File from ASTER GDS will not be available until early July.
  - Archive database corruption can occur due to AMASS-SGI interface issues.
  - The metadata for several sample products from MODIS, CERES and MOPITT do not adhere to the baseline.
  - New MODIS Oceans ESDTs are under development, some pending resolution of attributes.
- Work-off
  - ECS Performance Team working remaining D3 performance issues; currently able to support > 75% of performance requirement.
  - EDC has developed procedures to ensure no data loss; AMASS vendor patch expected in early May.

Production Status

- Verified capabilities
  - Ancillary data processing, MODIS and MISR L1, and ASTER L2 production capabilities have been verified except for performance.
  - MISR L2 science software is not yet available for testing.
- Issues
  - Critical resource contention and management problems led to substantial throughput reductions and occasional failures.
  - MODIS L1B science software will be replaced in June.
  - MISR science software is being replaced through mid-July; current science software requirements exceed baseline significantly.
- Work-off Actions
  - A Tiger Team has been formed to work ECS throughput and site configuration issues. Preparations are underway to complete the required changes in time for a re-run of the LaRC End-to-end Test by 6/3.

Search, Order and Distribution Status

- Verified capabilities
  - All fundamental search and order, and distribution requirements have been verified, including search and order using the V0 Client, and FTP Push, FTP Pull and 8mm distribution.
- Issues
  - Some types of searches are not currently supported due to database configuration problems.
  - Product order and distribution require workarounds that will be unacceptable once general users begin accessing the system in large numbers.
  - Cannot currently support full Landsat-7 distribution load due to server failures.
- Work-off Actions
  - Patches to address Landsat-7 distribution issues are being delivered 1st week of May; performance test is scheduled for mid-May.
  - Patches to address search and order, and distribution problems have been planned for 1st week of June and will be tested as part of MOSS-2.

System Management Status

- Verified capabilities
  - All fundamental system management capabilities have been verified, including system start-up and shutdown, and system component monitoring.
- Issues
  - HP OpenView does not always automatically start and shutdown all system components, apparently due to configuration problems; operator intervention is required.
  - HP OpenView intermittently does not report correct status for some system components; problem appears to be due to manual intervention on component startup.
- Work-off Actions
  - ECS Contractor is working with sites to resolve configuration issues.

Data Flows and Ingest/Archive/Distribution Readiness

Questions: What are all the data flows and their rates? Can DAACs ingest/archive/distribute fast enough?

- **Network flows (requirements and test results to date) are shown in the next several charts**
  - Mission critical network flows are implemented as dedicated networks and have all been tested several times and meet the requirements; a few minor discrepancies are being worked (resolution expected by May 15, 1999)
  - QA/SCF data flows meet February 1996 baseline requirements, but in some cases fall short of meeting the significant increases in science team requests. ESDIS continues to work with external service providers (vBNS, Internet 2) to meet the increased needs within budget; however, the ESDIS budget will not support system distribution throughput for significant requirements increases
- **Subsystem flows (i.e., EDOS processing, and DAAC/SIPS production, DAAC archiving and distribution) have been tested and continue to be tested and problems identified and resolved**
  - Most recent performance results are discussed in ECS ETE test analyses and more recent Terra End-to-End Science System (TESS) analysis
  - PI teams responsible for SIPS (CERES, MODIS, MOPITT) have participated in Terra End-to-End Science System (TESS) test

Q/A SCF Site Measured Network Performance

Revised 26 April 1999		Requested Requirements**					2/96 Requirements		Testing					
Destination	**Team (s)**	**WAN QA Traffic GB/Day**	**Kbps**	**ISTs**	**# of Users**	**Total Kbps**	**WAN QA Traffic GB/Day**	**Total Kbps**	**Test Period**	**Median kbps**	**Worst Hour Median**	**Current Status* (against requested flow)**	**Current Status* (against 2/96 flow)**	**Notes**
Boston Univ.	MODIS	7.30	777		4	1177	1.22	530	27-Jan-99 - 18-Mar 99	4476	876	**ADEQUATE**	**GOOD**	GPn-Abilene-vBNS
Colo State	CERES	2.68	285		5	785	2.68	785	Testing Proposed					Low Risk, good connectivity via NISN Boulder POP
CEO - JRC	MISR	2.00	213		1	313		100	03-Mar-99 - 03-Apr-99	541	70	**ADEQUATE**	**GOOD**	ALTERNET
GSFC	CERES, MISR	2.62	279				2.62							On NISN backbone, assumed to have excellent connectivity
JPL	MISR, ASTER	70	17777	3	42	22910	18.47	7099	10-Feb-99 - 24-Apr-99	14551	6548	**LOW**	**GOOD**	NISN: FDDI @ JPL; implemented b/w based on requested delivery time
LANL	MISR	0.30	32		1	132	0.30	132	Testing Proposed					ESNet, OC-3 backbone connection
London, U. K.	MISR	0.30	32		1	132	0.30	132	20-Jan-99 - 03-Apr-99	4444	1156	**GOOD**	**GOOD**	Lo-Fat Pipe
MSFC - GHCC	CERES	68.25	7268		11	8368	0.00	0	05-Mar-99 - 03-Apr-99	4196.5	2286	**LOW**	**GOOD**	NISN + FDDI to GHCC
NCAR	MOPITT	1.39	147	1	24	2858	1.39	2858	Testing in Progress					Low Risk, good connectivity via NISN Boulder POP
NOAA/NWS	CERES	0.02	2			2	0.02	2						Low Risk, Dedicated T1 and faster
NOAA ERL	CERES	0.04	4		3	304	0.04	304						Low Risk, good connectivity via NISN Boulder POP
Oregon State	CERES	18.38	1957		14	3357	18.38	3357	13-Apr-99 - 24-Apr-99	1334	350	**LOW**	**GOOD**	Tested using existing university provided ISP connection, dedicated 3Mbps service in place, will provide adequate service
Penn State	MISR	0.03	3		13	1303	0.03	1303						Low Risk, good connectivity via vBNS
SUNY-SB	CERES	0.21	22		2	222	0.21	222	13-Apr-99 - 24-Apr-99	2655	352	**GOOD**	**GOOD**	MAE-East-NYSERNET
U. Arizona	MODIS, MISR	2.14	228		8	1028	0.38	840	02-Apr-99 - 05-Apr-99	7312	3672	**GOOD**	**GOOD**	vBNS via Chicago
Univ Illinois	MISR	4.00	426		1	526		100						Low Risk, good connectivity via vBNS
U. Miami	MODIS, MISR	52.80	5622		7	6322	7.90	1541	02-Apr-99 - 24-Apr-99	4458	1873	**LOW**	**GOOD**	vBNS
U. Montana	MODIS	2.07	220		1	320	0.25	126	07-Apr-99 - 10-Apr-99	1344	794	**GOOD**	**GOOD**	Dedicated: T1
U. Toronto	MOPITT	0.43	46	1	1	457		100	18-Nov-98 - 03-Apr-99	1160	994	**GOOD**	**GOOD**	Dedicated: T1
U. Wisconsin	MODIS	43.18	4598		4	4998	20.04	2533	06-Apr-99 - 24-Apr-99	4949	2592	**LOW**	**GOOD**	vBNS
UCSB	MODIS	10.84	1155		7	1855		700	02-Apr-99 - 24-Apr-99	3746	2058	**GOOD**	**GOOD**	vBNS
UCSD - SIO	CERES	0.21	22		7	722	0.21	722						Low Risk, good connectivity via vBNS
UMD	MODIS	0.40	43		1	143	0.00	0					no requirement	Low Risk, good connectivity via vBNS
UVA	MODIS	2.70	288		2	488	0.00	0					no requirement	Low Risk, good connectivity via vBNS

Assumptions

1) QA Requirements - fully ramped up (Including MODIS proposed flows)
2) IST Flow (each) = 311 kbps
3) Total Kbps=100 Kbps per user + IST flow + SCF QA flow

**ESDIS has not committed to meet these requirements.
We are working to accommodate network flows within our budget;
however, the budget does not currently support the increased system throughput

*Criteria:	BASIS	ACTION
GOOD	Median of Daily worst hours >= Requirement	Monitor
ADEQUATE	Median of Daily worst hours < Requirement <= Median of Daily Medians	Monitor, plan improvement, implement as practical
LOW	Requirement > Median of Daily Medians	Monitor, plan improvement, implement ASAP
BAD	Requirement > 3 *Median of Daily Medians	Monitor, take immediate action to provide improved connectivity

SIPS Data Ingest into DAACs

Question: When will we be able to ingest SIPS data into the DAACs?

- **Automated, high-speed ingest of SIPS-generated products will be available in release 5A. Dates for installation of Release 5A vary from DAAC to DAAC. Operational dates are being worked with the DAACs to phase in Release 5A as soon after launch as possible. Target dates (subject to revision with detailed planning):**
    - EDC - August 31
    - GSFC - November 10 (after L + 104 days - due to need to be stable during the instrument checkout period)
    - LaRC - October 15 (due to need to be stable in support of SAGE III)
    - NSIDC - July 15

    Note: ECS identified a test window of 4/3-5/14 to perform joint ECS-MODAPS tests of the SIPS interface, but no test data or test coordination has been completed to date.

  – Work-arounds are planned to ingest some of the SIPS data into the DAACs at earlier dates than above
    - GSFC - working on placing data on an anonymous ftp site
    - LaRC - will provide manual ingest of MOPITT data; will have CERES data available via LaTIS

TESS Results

- Significant Accomplishments
  - Ingested and archived L0 spacecraft data from EDOS for MISR, MOPITT, CERES and MODIS
  - Processed spacecraft ancillary data and FDS data using DPREP
  - Processed L0 spacecraft into L1 products for MODIS, MISR, MOPITT and CERES
  - Produced some MODIS L2+ products from GDAAC produced L1 products
  - Ingested L1 ASTER data from ASTER GDS at EDC DAAC
  - Processed L1 ASTER data to L2 products
  - Demonstrated search and order from non-ECS sites, and distributed some products via FTP
- Issues
  - Some ancillary data (e.g., DAS, OSF, DAO, NOAA) interfaces are not yet available and will need to be tested in MOSS-2.
  - Workarounds need to be developed for system interfaces that will not be available at launch(e.g., ECS SIPs Interface).
  - DAACs need better training in valids generation and population for V0 Client.
  - QA operations concept needs further elaboration, and tools need to be completed.
  - Launch support science software and metadata requirements need to be delivered.
  - Need to test system with full 24-hour data set; planned for MOSS-2.

TESS Results by System Component

EDOS	
Interfaces	• Met I/F objectives with GDAAC, LDAAC, LATIS, and ASTER GDS (pre/post-test) for all instruments and nominal S/C data. • System problems with high rate processing, reprocessing, and operations training.
GDAAC	
Interfaces	• Met I/F objectives for EDOS, FDS, NOAA (partial). • DAO and NOAA GRIB interfaces being worked. • ASTER EDS and GDAS product transfers were initiated but unsuccessful since ASTER GDS did not receive e-mails sent from GDAAC. • Setup of PDR server and T3 MCST are being worked.
Processing	• DPREP processing was performed with simulated Orbit/Attitude pre-test. • Successfully processed real spacecraft orbit data and FDS attitude data with DPREP. • Successfully demonstrated MODIS L1 processing from EDOS-generated L0 products post test for approximately 1.5 hours of MODIS data. • System NCRs being worked. • Additional operations training and system familiarity needed.
User Access	• MODAPS, EDC EDS, V0 order for MODIS Land products, and subscription distributions were demonstrated . • QA update partially successful. • Valids generation requires training.

TESS Results by System Component (cont.)

LDAAC	
Interfaces	• Met I/F objectives for EDOS and FDS. • DAO and NOAA interfaces not tested. • EMOS-LDAAC DAS Interface being worked. • Subscriptions and distributions to LATIS, MOPITT, MISR successfully demonstrated with minor problems
Processing	• DPREP did not execute. Being scheduled post test (week of 5/2) • Successfully demonstrated MISR L1 (25 of 54 executions) processed from EDOS-generated L0 data for 3 of 5 orbits of MISR data. • System tuning is underway. • MISR L2 PGEs attempted unsuccessfully. • Additional operations training and system familiarity is needed.
User Access	• Subscriptions and distributions to MISR SCF were successfully demonstrated with minor problems. • QA update concepts for MISR and CERES need to be worked. • QA update tool not available. • Valids generation requires training.

TESS Results by System Component (cont.)

EDC	
Interfaces	• D3 Tape ingest goal was met • Sample SIPS inserts completed (partial) • NOAA, DEM I/Fs being worked.
Processing	• Successfully produced 167 of 168 routine and 39 of 44 on-demand ASTER L2 products. • ASTER EDS processing with ASTER-provided OSF will require significant effort to support automated processing from within ECS. • DEM processing was not tested during TESS.
User Access	• Subscriptions and distributions (ftp push/pull) to ASTER SCF completed. Demonstrated V0 search and order with some minor problems. • Valids generation being worked along with open NCRs for distribution. • QA update tool not available.

TESS Results by System Component (cont.)

MODAPS	
Interfaces	• SIPS I/F demonstrated - first time minimal problems. • System work to support automated generation of products to support SIPS DAAC ingest is being worked (not needed until ECS 5A Drop).
Processing	• MODIS L2/L3 products produced from GDAAC/EDOS processed data. • MODIS metadata inconsistencies are being worked.
User Access	• MEBDOS search/order and LDOPE QA update demonstrated successfully. • MODIS product distribution for QA and QA update process definition needs to be worked.
LaTIS	
Interfaces	• Met objectives for EDOS L0, LDAAC subscription, and GDAAC subscription interfaces (partial) • Open items related to DAO, MODIS L1B subset, and DPREPed Orbit/Attitude file ingests • CERES metadata inconsistencies being worked.
Processing	• CERES produced L1/L2 products using pre-staged DAO and toolkit Orbit/attitude data. • PGE 1.1P1 was not run due to missing MODIS L1B data.
User Access	• LATIS Client tool used by CERES SCF to perform search, order, distribution and visualization.

TESS Results by System Component (cont.)

MOPITT	
Interfaces	• Met objectives for LDAAC ingest interface.
Processing	• MOPITT generated L1 and L2 products with some problems that are being investigated further. Processing was performed using pre-staged DAO and toolkit Orbit/attitude data. QA flag manually set for products. • Metadata compatibility and automated generation of .met files being worked.
ASTER GDS	
Interfaces	• GDAAC and EDOS I/Fs demonstrated previous to TESS. • Post test processing of PDS data being worked. • GDAS and EDS subscription e-mail receipt being investigated. • ASTER GDS has provided partial L1A tapes to support EDC ingest. • ASTER will provide full L1A and L1B tapes after receipt of EDOS L0 PDS data tapes for processing.
Processing	• ASTER GDS L1 processing from EDOS L0 PDS data has not been completed to date. Plans to perform this week of 5/3 after delivery of EDOS L0 PDS tapes from TESS.
NSIDC	
Interfaces	• Sample inserts for MODIS products were performed, but some were unsuccessful due to metadata inconsistencies. • NISE product ingest being worked.

Road To AM-1 Launch

- 5/21-5/26: Spacecraft Pad Test (includes data ingest and processing at DAACs using live spacecraft data)
- 5/26-5/28: EGS-10 DAAC Operations Tests at GSFC and EDC
- 6/2-6/3: Re-run of ECS End-to-end Test at LaRC DAAC
- 6/7-6/8: EGS-10 DAAC Operations Tests at LaRC
- 6/9: ECS Release Readiness Review
- 6/7-6/11: MOSS-2 End-to-end AM-1 Ground System Test
- Week of 6/21: ECS Operations Readiness Review
- 7/15: AM-1 Launch